

Math 318 Discrete Math**Credit Hours:** 3**Scheduled hours per week**

Lecture: 3

Lab: 0

Other: 0

Catalog Course Description: Topics include: logic and set theory, functions, algorithms, recursion, combinatorics, and graphs.**Pre-requisites:** 23 on ACT or Grade of "C" or better in MATH 126 or MATH 125**Co-requisites:** None**Course Learning Outcomes:**

- A. Demonstrate a basic understanding of the terminology, symbology, and rules of basic proof systems and classical logic.
- B. Demonstrate an understanding of set definitions and symbology. Calculate set union, intersection, difference, and complements. Demonstrate understanding of subsets, ordered pairs, ordered tuples, and Cartesian products.
- C. Demonstrate the ability to discern between functions and relations, to identify one to one and onto functions, to calculate the inverse function using the switch and solve strategy. Form the composition and sum, difference, product, and quotient of functions. Demonstrate an understanding of range, domain and partial functions.
- D. Demonstrate a knowledge of the definition of algorithms, efficiency of algorithms and understand some sorting, searching, and division algorithms.
- E. Demonstrate a basic understanding of sequence and series, recursion, iteration, induction and linear homogenous recurring relations with constant coefficients.
- F. Demonstrate the ability to apply basic counting principals, permutations, combinations and the binomial theorem.
- G. Demonstrate an understanding of graph terminology, to include paths cycles and trees and basic algorithms such as least path.

Topics to be studied:

Symbolic logic
Fuzzy Logic
Set operations
Cardinality of sets
Recursively defined sets
Function definitions
One to one functions
Onto functions
Composition of functions
Algebra of functions
Inverse Functions
Searching and sorting algorithms

- Division algorithms
- Divisibility properties
- Non decimal basis
- Big Oh notation
- Sequence and Series
- Recursion
- Iteration and Induction
- Linear Homogeneous Recurring Relations with constant coefficients
- Fibonacci numbers
- Counting principals
- Permutations
- Combinations
- Binomial theorem
- Graphs
- Graph terminology
- Paths
- Cycles
- Trees

Relationship of Course to Program or Discipline Learning Outcomes:

(What program outcomes are being met by this course?)

For general education courses, a listing of the general education competencies that are met.)

Relationship of Course to Mathematics (MATH) Student Learning Outcomes:	
Demonstrate understanding of the language of mathematics, by their use of symbols, definitions, word phrases, and representations.	x
Display proficiency in mathematical computations.	x
Implement mathematical techniques to solve applied problems.	x
Employ appropriate technology to demonstrate knowledge of mathematical concepts.	x
Exhibit mastery of core course competencies.	x
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Relationship of Course to General Education Learning Outcomes:	
Composition and Rhetoric Students illustrate a fundamental understanding of the best practices of communicating in English and meet the writing standards of their college or program-based communication requirements.	
Science & Technology Students successfully apply systematic methods of analysis to the natural and physical world, understand scientific knowledge as empirical, and refer to data as a basis for conclusions.	
Mathematics & Quantitative Skills Students effectively use quantitative techniques and the practical application of numerical, symbolic, or spatial concepts.	X
Society, Diversity, & Connections Students demonstrate understanding of and a logical ability to successfully analyze human behavior, societal and political organization, or communication.	
Human Inquiry & the Past Students interpret historical events or philosophical perspectives by identifying patterns, applying analytical reasoning, employing methods of critical inquiry, or expanding problem-solving skills.	
The Arts & Creativity Students successfully articulate and apply methods and principles of critical and creative inquiry to the production or analysis of works of art.	
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Special requirements of the course: None

Additional information: None

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